SIGMA XI QUARTERLY

Vol. XVI JUNE, 1928 No. 2

Whitney on "Unity in Research"
Myers on "Lung Diseases"

CONTENTS

Editorial Comments 43
Unity in Research—W. R. Whitney 45
Our Knowledge of Lung Diseases—J. A. Myers 50
Chapter Installations 57
Minutes of Executive Committee 63

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DR. W. D. COOLIDGE

DR. W. R. WHITNEY

"Companions in Zealous Research"

DR. IRVING LANGMUIR

SIGMA XI QUARTERLY

VOL. XVI JUNE, 1928 NO. 2

EDITORIAL COMMENTS

The Society extends welcome to five new chapters: Arizona, Lehigh, University of Maryland, Kansas State College, and the University of Illinois College of Medicine. The accounts of the installations make interesting reading. Sigma Xi now numbers fifty-one chapters with a total chapter enrollment of members and associates approximating 6500. There are pending before the executive committee inquiries and possible petitions from seventeen different institutions—a fair measure of the Society's progress and influence in the educational world.

* * * * * *

The QUARTERLY never offered a more illustrious exemplification of the meaning of its motto, "Companions in Zealous Research," than the photographs of the three internationally known scientists which compose the frontispiece of this issue. Associated for many years in the Research Laboratory of the General Electric Company, they are all members of Sigma Xi, elected by the Union chapter. At a joint meeting of the Rensselaer and Union chapters held in the Sage Dining Hall of Rensselaer Polytechnic Institute May 4, these three gentlemen were presented with Sigma Xi keys by the departments of physics and chemistry of Union, in token of the profound respect in which they are held by the chapter, and as a slight return for the invaluable aid they have rendered these departments of Union College.

The occasion of the joint dinner was made memorable also by the presence of Mr. John Knickerbacker, an alumnus of Rensselaer and one of the founders of Sigma Xi at Cornell in 1886. The Rensselaer chapter presented Mr. Knickerbacker with a key of the modern type,

and he responded with some interesting history concerning the beginnings of the organization.

* * * * * *

We are privileged to present in this issue Dr. Whitney's address delivered in Chicago on the occasion of the Inaugural Meeting of the Midwest Association of Sigma Xi, April 28. The Association was host to the national officers who had been holding their annual spring meeting at the office of President Moulton during the day, and the evening address was preceded by a dinner at the Chicago Bar Association attended by alumni members and associates, the executive committee and the alumni committee of the Society. The affair was notable in many respects. It marks another step in the organization of Sigma Xi alumni. For the first time since the alumni movement was begun, the executive committee and the alumni committee met together in conference. Dr. Whitney's address is an important utterance from one of our foremost investigators in the fields of both applied and pure science. When a group of men of the prominence and influence of those who constitute our official board is willing to give all of one day and a part of another to the consideration of Sigma Xi affairs, that is an indication of the importance of the work of the Society. It is difficult to see how under the circumstances in which Sigma Xi is now finding itself any obstacles can permanently prevent the expansion of its usefulness.

UNITY IN RESEARCH

W. R. WHITNEY

[Address before Midwest Association of Sigma Xi, Chicago, April 12, 1928]

This is a research on a new presentation of an old subject. I might have talked about our accumulated knowledge (large K) or the integrated sum, "Sigma" K, of all the infinitely small increments $\frac{dk}{dt}$. But I will try to interest you only in the positive small $\frac{dk}{dt}$. I assume that large K, our so-called fundamental knowledge, may be largely variable, uncertain and wrong, and yet with a positive dk things are not so bad. This gives me a chance to compare dk with decay, and point out that you may well sing "Change and decay in all around I see," if you always keep the real value of change in sight and see only the right kind of dk.

Our knowledge of matter, gravitation, light and all the other so-called fundamentals is not fixed, but full of useful change. Big K is not so important as is little dk. It was worth a great deal to change the concept of conservation of energy so as to make ordinary matter of it. When we change the hard, round atom of centuries into a wonderful celestial system, we open a new universe, and when we realize that no one has fixed with inflexible mechanism the thing we call light, there is hope that we may see more new things. My purpose, therefore, is to expound the value of "change and dk," with the hope of stimulating our appreciation of creation, which has heretofore been entirely inadequate.

Instead of using the values of large K, or even those prominent historical individuals who usually dominate such a talk, I will select five rather obscure research men who are quite equally distributed through the long period of human history. I want you to see how they severally appreciated creation and dealt with little dk. They were all very earnest, thoughtful men.

First is Antonio Grimaldi. His family dwelt on the Italian Riviera in the well-known cave near Mentone. Here the careful excavation of years has shown how he lived during nearly 200,000

years. Five human skeletons, dug out at different levels, show how his body changed, and countless stone tools show how he advanced in art and skill. Evidently it took thousands of years to learn that flint was better than limestone for tools, and other thousands to learn how to chip an arrow or spear anywhere near as perfect as those familiar to the whole world just before the bronze age. As the deposits still in the cave, after years of excavation, are made up of small pieces of bones evidently broken between stones for the marrow, it may be that this earliest man, who comes between the Neanderthal and Cro-Magnon man, maintained himself largely on the scraps left by nightly combats between larger animals, and all that he could safely do was to collect the bones of the dead animals and break them up for their contents.

In any case it is clear that getting enough to eat and keeping alive among bears and elephants, whose bones are there, kept him extremely busy. Antonio Grimaldi could only begin to appreciate creation perhaps by worshipping the warm sun, and though his rate (dk over dt) was positive, it was probably low. If he saw in the rocks about him any of the things which were certainly there, whether of gold, copper, iron or aluminum, or coal or grains for food, he could not differentiate nor integrate them. Certainly he had no mental equipment for appreciating the possibilities of an infinite elasticity, and he had hardly begun the conquest and control of his environment. This may be a crude picture of, say, 80,000 or 8000 B.C., but it is roughly correct.

My second inconspicuous research man is Ashur-nasir-pal. He was prominent about 875 B.C. His well-made alabaster inscriptions, two of which I have seen at Union College and which are quite common in world museums, give us a good insight into his period. Man had made long strides since Antonio. Ashur fought over and subjected about all the territory of the Tigris and Euphrates valleys, from the Mediterranean to the Indian Ocean. He inscribed the fact that he had taken the gold, silver, lead and iron from all his enemies and so built a city for all time. He admitted being "the strong one among the Gods," and that, so far as he was concerned, the universe was complete. He finally decayed himself, but didn't do much with little dk. We may say that he dealt largely with the accumulated K by merely rearranging it, as it were. But he represents to me another real fellow trying to do analytically the very best he could.

But all the while little dk was at work and appreciation had got a start. Times were changing.

A third researcher was Democritus. I introduce him because he was a Greek, and some profess to think that there the apex of civilization is reached. Approximately 20% of the people were free enough to think; the rest had to work, and there was not supposed to be any mixing of thought and work. Research, if by that we mean experiment, was not necessary to the Greeks, and so Democritus fixed a hard, round atom on an unsuspecting public for about 2500 years. This is probably typical of those who do not try experiments, who do not seek, believing they already know, or who derive from inner consciousness all they need of the universe. The stock of knowledge was not so much increased as rearranged at this time. It was easy, for example, at that time, to decide in advance the outcome of a war by examining the entrails of certain dead animals, or by propitiating in some practical way the delphic oracle.

The big K of that time (that is, what the Greeks thought they knew) is not so important now as the fact that little dk was continually positive. It would have been a sad and speculative world if it had stopped changing then, but change was already becoming, as it is now, the most firmly fixed thing in existence. And so I leave the civilization of the Greeks for those who say they would enjoy it, but who actually seem to enjoy automobiles, radio, golf and freedom better.

Next I present John Woolman. You may have met him in President Eliot's five-foot bookshelf, but he is generally not well known as a researcher. He was a Philadelphia Quaker who preached and wrote against slavery and other low-down things a hundred years before our Civil War. He was another of my group of thoroughly earnest, active and representative men. He forcibly reduced his business activities in order to have time to think and preach. He fought terrible battles with himself, to force the human to live aright. He would not pay military taxes because he so hated war, but probably he did as much to bring about the Civil War as Mrs. Stowe or John Brown. He once wrote that he saw smallpox "as a messenger from the Almighty to be an assistant in the cause of Virtue." Vaccination was not well appreciated at that time, and it is a sad commentary that he himself finally died of this dread disease.

Possibly if he could have foreseen the advantages of war, whether against slavery or smallpox, he might not have felt so sure about the

Almighty's ideas. And so we see that even in modern times Sigma K may not comprise the whole story, for dk will be continuous.

And now I come to a better known name, but a little known word. Emerson, writing in connection with general increase of knowledge and in particular with the helpful discoveries of anæsthetics, said:

> "There is evidently a feeling of awful power in this creative saliency, this saliency of thought, this habit of saliency of not pausing, but going on, which is a sort of importation and domestication of the Divine Effort in Man."

This almost unknown word, saliency, may well carry with it the idea of projected efforts gradually but certainly producing the right kind of dk. This is to lead us to make better use of the limitless assets of our environment. Saliency, or creative effort, now properly becomes an increasing attribute of man.

And so I reach my latest research celebrity, the 7th Duke of Devonshire, who in 1871 gave $35,000 toward the establishment of the Cavendish laboratories at Cambridge, England. Here, under Maxwell, Raleigh, and J. J. Thomson there was built one of those groups or organizations for the improved appreciation of creation. It is representative of a definite period, as Grimaldi and Woolman and the others were. It is also representative of other groups of highly and very specially educated men, who continually ask questions of beneficent Nature, men who question so inquisitively that their lives are filled with new actions rather than old familiar words. This is probably what Emerson meant by "saliency;" an active appreciation of lightly veiled abundance.

In the time available I can only point to a few of the increments of knowledge which came from that Cambridge group. The electromagnetic conception of light by Maxwell probably occurs to you first, and to me Raleigh's discovery of argon seems second, because I am particularly interested in its use in incandescent lamps, for there it saves enormous energy or its equivalent, which is available for other uses. Raleigh's minute difference in density of nitrogen from different sources, when expressed as dk, or added knowledge, soon became worth millions of dollars to those who wanted light.

In that laboratory the first physics students to acquire the Certificate of Research were Rutherford and Townsend. By this group the old atom became the flexible thing we now know so helpfully well and so hopefully incompletely. A universe within a point.

Thomson, following the lead of Crookes, found a fourth state of matter. His corpuscle, which then became the electron, was shown to be the element from which all elements are made. Richardson, who worked in that group, finally developed the ideas of thermionic emission which in turn led to the various vacuum tubes used for sending, receiving and amplifying in "radio." It then became easier to appreciate photo-electric phenomena and hence the development of radio pictures. Among the countless other fields which extend in perfect order from the corpuscular experiments of the Cavendish group we can see our present conception of the production of light. It is now seen as orderly activities of nicely oriented electrons, the expansion of magnetic fields like those of radio, and by the same token we appreciate the production of x-rays, gamma rays and even the newest cosmic rays. So also for the chemist the wonderful experimental work on the atomic nucleus and the isotopes which cleared up a cloudy picture of chemical elements that had persisted from the beginnings of chemistry. These and scores of similar researches, both in that laboratory and elsewhere, lead us to expect that we now see the great possibilities in the development and happiness of mankind which efficient inquiry plainly guarantees. This is what I mean when I say that I hope we are now learning how to appreciate in a finite way a really infinite creation, even if we actually have to do it by infinitely small increments. It is the happy function of Sigma Xi to be increasingly interested and instrumental in fostering research.

DEVELOPMENT OF OUR KNOWLEDGE OF THE DETECTION OF LUNG DISEASES

J. A. MYERS, PH.D., M.D.
Associate Professor of Preventive Medicine, University of Minnesota

[Paper read at Carlton College, January 14, 1927]

In recent times there has been a very definite decrease in the incidence of reported tuberculosis of the lungs with an increase in the incidence of other diseases of the lungs. Frequently it is stated that cancer is on the increase. Many more cases are detected than in times past. At one time cancer of the lungs was held to be a rare condition except when it spread there from some other organ of the body. Perhaps it is not more common today than it was a century ago but our methods of detecting it have been so improved that many cases are now discovered which at that time were entirely overlooked or called consumption.

The ancient physicians had very few facilities for detecting diseases of the internal organs. They developed the sense of sight to a remarkable degree but while their keen powers of observation helped tremendously they did not always suffice in detecting conditions of the invisible organs. The sense of hearing was also employed by placing the ear directly against the chest wall. The sounds heard were sometimes likened to those heard from boiling vinegar. Centuries passed before much more than naked eye inspection and the direct application of the ear to the chest were employed in the detection of diseases. There are many conditions which involve the lungs that cause great emaciation of the body. This emaciation was visible to the naked eye, hence the name consumption was applied to all of these conditions before any differentiation was made between them.

In the year 1761 a physician by the name of Auenbrugger was of the opinion that he had been greatly aided in detecting diseases within the chest by tapping over the surface. He said the underlying organs that contained air like the lungs, gave rise to a note very different from solid organs like the heart and liver and when the lung, because of disease, became solidified, tapping over it would result in a note no different from that heard over the heart or the liver. He felt,

therefore, that this method of examination contributed some evidence which inspection of the chest did not contribute, so by combining the two he was better able to determine the condition of the patient. This man talked and wrote considerably about his new method, known as *percussion*, but his colleagues would not admit that it had any value. Fifty years later when he was an old man and only one year before his death, his method was taken up by Napoleon's private physician, Corvisart, who found it to be of great value and convinced physicians everywhere that it should be employed in every examination of the chest.

It was in 1816 that a physician living in Paris and suffering from tuberculosis himself one day conceived the idea that he would be greatly aided in the detection of diseases if he could place one end of a hollow tube over the chest and listen through it. There was a patient in his office so he took some paper from his desk, rolled it into a cylinder, placed one end of the cylinder against the patient's chest and listened over the other end with one ear. The sounds from within the chest came through quite distinctly. They were so distinct that he was able to describe them with considerable accuracy and many of his descriptions are as valuable today as they were the day he made them. With this principle in mind he constructed a more elaborate device for listening to the chest which he called the *stethoscope*. Although this was a crude device, he detected signs and described them in such a way that no one has been able to improve upon many of his findings although the stethoscope has been greatly elaborated since his time. This physician, Laennec, had spent much time in studying the normal anatomy of the dead body. He had also spent much time at the post mortem table, therefore, his new method of examination greatly increased his interest in the structure of the body both in health and disease. When one of his patients would die he was very desirous of seeing the diseased organs to determine whether the condition found corresponded with what he believed it to be while listening over the living chest; in other words, to determine whether his interpretations were correct. Prior to his time nearly all diseases of the lungs were regarded as "consumption." Now with naked eye *inspection*, *percussion*, and the stethoscope for auscultation, Laennec pointed out that there were several different diseases of the lungs, some of which never before had been described. He was able with these phases of the examination to actually differentiate between some of them while the patient was living. For ex-

ample: previous to his time *lung fever* was a common diagnosis; indeed, because of lack of knowledge most acute conditions of the lungs accompanied by fever were then called *lung fever*. With his newly invented stethoscope he pointed out the difference between such diseases as pleurisy, pneumonia, and bronchitis. To the three phases of physical examination was added a fourth known as *palpatation*. The work of Pottenger in recent years has contributed greatly to our knowledge of this phase. By palpatating the surface of the chest one is often able to determine upon which side the disease is located as well as something of its duration.

The next great step in the detection of diseases of the lungs consisted of making a study of the materials expectorated from them. First these materials were injected into the bodies of animals with the result that the animals developed disease which did not differ from that attacking the bodies of people. This experimental work began about 1843 and has continued to the present. Through it man's life span has been increased.

After it was demonstrated that this material contained something that produced the disease in animals when it was inoculated into their bodies, the question arose as to what it actually contained. Fortunately man's vision had been greatly extended. The microscope had been invented and he could now see objects many hundred times smaller than the ancient physician could see. A country practitioner, in Germany, possessing a microscope, began to inspect through it the material that came from the lungs of some of his patients. In this material he saw that one kind of germ was always present. He was of the opinion that this was the cause of tuberculosis, yet his evidence was not sufficient to prove his point to others. He decided to use different dyes in an attempt to stain this germ. After much effort, he found a dye that always stained it red and was not easily washed out with acid. Because of this staining quality the microorganism was later known as an acid-fast germ. This further convinced him that these germs were the real cause of tuberculosis but he decided that he must go a step further if he was to convince his colleagues. So he began to study the foods of germs. His studies were extensive and he found a food upon which these germs would grow satisfactorily. Obviously this brought them further under his control and left only one step to convince others of the cause of tuberculosis. This step consisted of taking the germs that he had grown artificially from the materials expectorated from tuberculous

lungs, inject them into the bodies of living animals to see if they would produce the disease in these animals. He did this in 217 animals with the result that all developed the disease. This physician, Robert Koch, went before a medical society in 1882, described his experiments and convinced those present that this germ which he had designated tubercle bacillus was the real cause of tuberculosis. This was the beginning of the time when it was possible to determine with a high degree of certainty the presence of tuberculosis. It is the finding of tubercle bacilli under the microscope or by inoculating suspected material, such as sputum from a patient into the bodies of animals, that gives us proof positive that a patient is suffering from tuberculosis. Thus another great aid in the detection and the differentiation of lung diseases came into existence. The tubercle bacillus having been discovered and grown in pure culture, it was now possible to study its products of growth, etc. Such study led to the production of *tuberculin*. Koch firmly believed in the use of tuberculin in the treatment and prevention of tuberculosis. He overestimated its value in treatment although it still is regarded of considerable value in certain forms of tuberculosis. In the detection of tuberculous infection and disease, tuberculin is very helpful.

In 1907 Von Pirquet presented a simple tuberculin test which can be applied to the surface of the skin in any age of life without harm. This test is spoken of as the epidermal or the Von Pirquet test. It is of great value in determining the presence of tuberculous infection, but tells us almost nothing about the presence of tuberculous disease. When this test is positive we know that at some time the one to whom it has been applied has come in contact with tubercle bacilli, that they have entered the body and are still present. In a high percentage of people enough resistance is developed to wall off the tubercle bacilli so that tuberculous disease does not develop. Nevertheless such people have been infected. This test, therefore, is of great value in determining the presence of tuberculous infection. For the presence of tuberculous disease, tuberculin is injected beneath the skin and the test is known as the subcutaneous test. Usually it is applied only after all other phases of the examination have been made and there is still some question as to whether tuberculous disease requiring treatment exists. The reason for making this the last phase of the examination is that tuberculin in some cases is harmful unless it is very carefully administered. Therefore it should never be used promiscuously and if the disease can be de-

tected in any other manner, it is better to omit it. In really questionable cases, however, it may be given with safety and contributes to the physician worthwhile information in differentiating between tuberculous and non-tuberculous lung condition.

The next step was taken when man's vision was again extended by a man who was not a physician but a physicist. This was Roentgen, who presented his work on the discovery of the x-ray in 1895. The x-ray is capable of penetrating certain substances, tissues and even organs of the body, but is obstructed by others. The more dense the tissue or the organ the greater the obstruction to the x-ray. For example: the bones, the heart, and the liver offer definite obstruction to the rays, while organs less dense such as the lungs offer very little obstruction to them. If, then, we place an x-ray tube back of the patient's chest and a photographic film in front of his chest the x-ray will be obstructed by the dense organs which in turn will cast definite shadows on the film, while the lungs will cast only slight shadows. But if disease has attacked the lung and has caused parts of it to become thickened and dense obviously these parts will cast greater shadows than the normal lung. Therefore, the x-ray examination merely consists of a study of lights and shadows. So far as we know, there is no shadow that is absolutely characteristic of any single disease. Thus the x-ray cannot with a high degree of accuracy be used in differentiating between the various diseases of the lungs, but when taken with other phases of the examination it renders valuable aid. In fact it is second in importance only to finding tubercle bacilli in the sputum. Sometimes small areas of disease are located very deeply in the lung tissue, so deeply in fact that they cannot be detected by physical examination from the surface of the chest. In such cases the x-ray study may be the only phase of the whole examination that gives us much evidence of the location, extent, etc., of the disease. Therefore, the x-ray examination of the chest is indispensable but is not infallible.

Careful observations from the time of the ancient physicians to the present have led us to recognize certain symptoms of considerable significance in the detection of tuberculosis. Many people believe that cough persisting over several weeks or pleurisy or night sweats are always indicative of tuberculosis. There is no symptom that always indicates tuberculosis yet there are many symptoms which may lead us to suspect it. The two that most commonly are found to be due to tuberculosis are pleurisy with accumulation of fluid in

the pleural cavity and hemorrhage from the lungs, yet even these may be caused by other conditions than tuberculosis. Less important than these two symptoms are cough with expectoration, loss of weight, loss of strength, persistent daily temperature elevation, accelerated pulse, night sweats, etc. The physician who becomes expert in the detection of tuberculous disease reaches the stage where in the evaluation of data a great deal of emphasis is placed upon symptoms. Thus he learns much in the differentiation of lung diseases.

A recent advance in the detection of diseases of the lungs was made through the bronchoscope which makes it possible to look directly into the lung by passing an electric lighted tube through the mouth, throat, trachea, and bronchial tubes. A great deal of information is obtained in this manner. For example: one is able to look through this tube and determine from which lung pus is coming, then follow the course of the pus to or near its origin. In this manner foreign bodies that have been aspirated through the trachea may be removed from the lung. Some such bodies may be located by means of the x-ray before one passes the tube, others are transparent to the x-ray and it is only by inspection through the tube that one is able to locate them. It happens that in some cases foreign bodies produce abscesses which will not heal until the cause has been removed. In more obscure conditions where one is unable by all other methods to determine the exact nature of the disease condition it is possible to pass an instrument through the tube to the site of the disease and remove a small piece of the tissue for study under the microscope. This method is teaching us that many people whom we formerly sent to sanatoriums and hospitals for the tuberculous are suffering from cancer and other non-tuberculous diseases of the lungs.

A number of years ago it was learned that by placing in the stomach and intestine a harmless substance which would obstruct x-rays much could be learned about the contour, position, etc., of these otherwise transparent organs. Barium sulphate has been used quite extensively for this purpose and abdominal diagnosis has been greatly aided by it. The question arose as to whether some opaque substance might be introduced into the bronchial tubes, thus aiding greatly in outlining on x-ray films their positions, contour, etc. Such a substance was found in iodized oils. In certain cases when all other methods of examination have been exhausted and the diagnosis is uncertain the introduction of such oils into the bronchial tree helps a great deal in

bringing out on the x-ray film evidence of conditions accounting for the patient's illness.

Thus it has taken man a long time to learn methods of examination which makes possible a reasonable degree of accuracy in the diagnosis of chest diseases. Most that we know has been learned in just a little more than the last century, the greatest advances having been made in the past fifty years.

REPORTS OF INSTALLATIONS

ARIZONA

The Chapter was installed February 22, 1928, by Dr. W. F. Durand, of Leland Stanford University, member of the national Executive Committee of Sigma Xi. The following program was carried out:

Assembly of University of Arizona Sigma Xi Club

Club called to order.....President P. H. Burgess
History of club.....Dr. H. B. Leonard, Sec.-Treas.
Reading of Petition for a Chapter.....Dr. W. P. Taylor
Statement of Action of the Executive Committee
of the National Society.....Dr. W. F. Durand
Presentation of Candidates for Initiation.....Dr. C. T. Vorhies
Presentation of the Charter.....Dr. W. F. Durand
Charge to the New Charter.....Dr. W. F. Durand
Response for the Chapter.....Dr. D. T. MacDougal
Discussion

THE SIGMA XI BANQUET

UNIVERSITY OF ARIZONA CHAPTER

University Dining Hall, 7:00 P.M.

Open to Members of Sigma Xi, Their Husbands and Wives

DR. P. H. BURGESS, Toastmaster

Greetings to the new chapter....Directors F. J. Crider, Boyce Thompson, Southwestern Arboretum, representing Board of Regents
The University and Sigma Xi.....President Byron Cummings, University of Arizona
Sigma Xi and the University.....Dr. W. F. Durand, Stanford University

FIRST SIGMA XI LECTURE

University of Arizona Chapter

University Auditorium 8:30 P.M.

Subject: "Science and Civilization".....Dr. W. F. Durand, Stanford University

The officers of the Chapter are:

President, Dr. Paul Steere Burgess
Vice-President, Professor George Thornhill Caldwell
Secretary-Treasurer, Dr. Heman Burr Leonard

Report submitted by HEMAN BURR LEONARD, *Secretary*

LEHIGH

The petitioners for a chapter of the Society of the Sigma Xi at Lehigh University met with the installing officer, Dean George B. Pegram of Columbia University, on March 1, 1928, at 4:30 P.M., in the Faculty room of the Alumni Memorial Hall, for the ceremony of installing the new Lehigh Chapter.

The meeting was opened by a preliminary statement by Dr. Richards concerning the earlier efforts to secure a chapter of the Society at Lehigh.

The petition to the president, executive committee and members of the Society of Sigma Xi for a chapter at Lehigh was read by the secretary pro tem. A formal statement was then made by the installing officer, Dean Pegram, regarding the action taken on the petition. He stated that the executive committee had recommended to the annual convention in Nashville in December, 1927, that a chapter of Sigma Xi be granted to Lehigh University and that the convention had unanimously passed this recommendation.

Ten petitioners not already members of the Society were initiated into full membership in the Society by Dean Pegram, and four of the petitioners were promoted from associate membership to full membership. The constitution was then signed by the new members, and at the end of the meeting was signed by the remainder of the charter members.

The charter for the Lehigh Chapter was presented by Dean Pegram and was accepted by Dr. Richards on behalf of the petitioners. The charter was read by Dr. Richards. The charge to the new Chapter was given by Dean Pegram, and response for the Chapter was made by Dr. Richards.

The committee on nominations of officers for the new Chapter, Professor Stoughton, chairman, reported the following nominations: for *President*, Dr. C. R. Richards; for *Vice-President*, Professor B. L. Miller; for *Secretary*, Professor L. L. Smail; for *Treasurer*, Professor C. C. Bidwell. It was moved that these nominees be declared

unanimously elected. Dean Pegram called for a vote, and the motion was passed.

President Richards then commented on some of the matters that will need to be considered by the Chapter shortly.

It was suggested that the report of the by-laws committee should be sent to the members of the Chapter as soon as possible.

A committee on nominations of alumni members of the Chapter was appointed, consisting of Professors Stoughton, chairman, Reynolds, Long and Turner.

The installation ceremony of the afternoon was followed by a dinner in the evening at the Hotel Bethlehem. Members of the Society living in the vicinity of Lehigh University were invited to attend the dinner. Forty-three members of the Society, including eleven not members of the Lehigh Chapter, were present. President Richards acted as toastmaster, and called on Dean Pegram, Dean D. B. Prentice of Lafayette College, and Professors Stoughton, Long and Miller of Lehigh University to speak.

L. L. SMAIL, *Secretary*

UNIVERSITY OF MARYLAND

The meeting was called to order at 4:00 P.M., March 2, 1928, by Dean George B. Pegram, the installing officer.

Messrs. Eichlin, Norton and Patterson, not being at the time members of the Society, were initiated by Dean Pegram.

The petition of the Sigma Xi Club of the University of Maryland for a Chapter of Sigma Xi was then read by Dean Auchter.

Dean Pegram announced that the Executive Council and Society of Sigma Xi had acted favorably on this petition and stated that the new Chapter should be designated as the Maryland Chapter. He then read and presented the engrossed copy of the charter to the acting president of the club. Following this he charged the members present to be true to the ideals of Sigma Xi and offered some suggestions for their guidance.

Dr. A. F. Woods replied to the charge and assured Dean Pegram of our continued earnest efforts in the interest of scientific research.

The nominating committee (F. W. Geise, Chairman) then reported the nomination of the following:

For *President*, C. O. Appleman

For *Vice-President*, E. C. Auchter

For *Secretary-Treasurer*, M. M. Haring

It was moved, seconded and carried that the report of the committee be accepted.

No other nominations being made, it was moved, seconded and carried that the acting secretary cast the ballot.

Dr. Pegram surrendered the chair to Dean Appleman, who thanked the members for their confidence in him and pledged his continued efforts in behalf of the chapter.

The committee on Constitution and By-Laws (E. S. Johnston, chairman) presented its efforts to the Chapter. It was moved, seconded and carried that the matter be laid on the table for consideration at the next business meeting.

Following this there was a period of discussion with Dr. Pegram concerning matters of our future activities.

Dr. Woods presented the Chapter with a copy of the "History of Sigma Xi."

At 6:00 P.M. the committee on arrangements (E. C. Auchter, chairman) reported by placing before the members, their wives and guests a well-planned dinner. Dr. Appleman, as toastmaster, then introduced Dr. S. M. Shoemaker, chairman of the Board of Regents of the University of Maryland, and Dr. H. J. Patterson, Dean of the College of Agriculture and Director of the Experiment Station of the University of Maryland, both of whom made brief comments on the progress of research in Maryland. A letter from Dr. Pearson was read at this time. He sent greetings to Dr. Pegram, expressed his gratification over the installation of the Chapter and expressed regrets over his inability to be present. It was also voted to send the following telegram to Dr. R. A. Pearson: "The Maryland Chapter of Sigma Xi at banquet assembled sends you and Mrs. Pearson greetings and best wishes for a restful vacation."

At 8:00 P.M. an eventful and happy day was fittingly concluded when the members and a large number of guests listened to two inspiring addresses by Dean Pegram and Dr. Woods.

MALCOLM M. HARING, *Secretary*

KANSAS STATE AGRICULTURAL COLLEGE

The installation of the Kansas State College Chapter of the Society on March 3 and the program which was arranged in connection therewith were carried out very smoothly.

The installation was conducted by Dr. George A. Baitsell, Professor of Zoölogy, Yale University, at 2:30 P.M. in Calvin Hall.

Forty-eight of the 57 charter members were present. The petition was read by Dr. C. W. Colver, Professor of Organic Chemistry, and the action of the Nashville Convention was announced by Dr. Baitsell. After a brief address to the charter members by Dr. Baitsell, Dr. James E. Ackert presented the names of the following as officers for the new chapter: *President*, L. E. Call; *Vice-President*, Geo. A. Dean; *Secretary*, C. W. Colver; *Treasurer*, G. E. Raburn; and *Extra Committeemen*, R. K. Nabours and E. C. Miller. These men were elected to the various offices upon motion duly made and seconded. The charter was delivered to Dean Call who was then conducted to the chair by Dr. Baitsell. A proposed constitution and by-laws were then read by the Secretary and after some brief remarks and discussion were adopted.

The installation banquet was held in the College Cafeteria at 6:30 P.M. There were 150 present including eight from the University of Kansas Chapter and two from the Kansas State Teachers College, Hays, Kansas. The speakers at the banquet were F. D. Farrell, President of the Kansas State Agricultural College; W. Y. Morgan, President of the State Board of Regents; and Dr. George Baitsell, Yale University. President Farrell spoke particularly of Research at the Kansas State Agricultural College and mentioned a long list of illustrious men and women of science who had graduated from the College. An outline of this address is included herewith.

More than 200 attended the public address by Dr. George A. Baitsell in Recreation Center, following the banquet, at 8:15 P.M. The address was a scholarly one upon "The Relation of Coagulation to Tissue Formation." The address was supplemented with about 40 slides showing the results of his own work.

We appreciate the very high honor which has come to us and to the Kansas State Agricultural College with the granting and installation of this Chapter. We are looking forward to closer associations with others of the Society and hope that we may maintain a very high standard in the Society.

C. W. COLVER, *Secretary*

COLLEGE OF MEDICINE OF THE UNIVERSITY OF ILLINOIS

The installation of the College of Medicine of the University of Illinois Chapter of the Sigma Xi was held March 9, 1928, at 4 P.M. in the Library of the Medical Research Laboratory Building and was

conducted by the National President, Dr. F. R. Moulton, assisted by Professor George A. Baitsell, member of the Executive Committee. The petition for the charter for the College of Medicine of the University of Illinois Chapter of the Sigma Xi was read by Dr. William F. Petersen. President Moulton made a statement concerning the action of the Executive Committee and of the convention of the Sigma Xi to the effect that this petition had been considered and favorably acted upon. Professor Baitsell conducted the initiation of the petitioners, not already members of the Society and those promoted from associate to active membership. The following petitioners were initiated:

Dr. L. Arnold, Associate Professor of Bacteriology and Preventive Medicine

Dr. A. Bachem, Professor of Bio-Physics

Dr. E. A. Boyden, Associate Professor of Anatomy

Dr. F. H. Falls, Professor and Head of Department of Obstetrics and Gynecology

Dr. R. H. Jaffe, Associate Professor of Pathology and Bacteriology

Dr. A. F. Lash, Associate in Gynecology

Dr. N. Pierce, Professor of Laryngology, Rhinology and Otology and Head of Department

Dr. C. S. Williamson, Professor of Medicine and Head of Department

The following associates were promoted to membership:

Dr. A. G. Cole, Instructor in Physiological Chemistry

Mr. R. L. Webb, Instructor in Anatomy

President Moulton presented the charter to the petitioning group and delivered the charge to the new Chapter. The response from the Chapter was made by Dr. Welker.

The following officers were elected: Dr. D. J. Davis, Dean of the College of Medicine, *President;* Dr. William H. Welker, *Secretary;* Dr. I. Pilot, *Treasurer;* Dr. V. E. Emmel, Dr. W. F. Petersen and Dr. H. A. McGuigan, members of the Executive Committee.

A general discussion followed the election.

At 6 P.M. a dinner was served to the Chapter at the West Side Student Y. M. C. A.

Following the dinner Dr. Charles F. Hottes, Professor of Plant Physiology at the University of Illinois, delivered a lecture on "Some Recent Researches on the Physiology of the Cell" in the library of the Medical Research Laboratory Building.

WM. H. WELKER, *Secretary*

MINUTES OF THE MEETING OF THE EXECUTIVE COMMITTEE

The spring meeting of the Executive Committee was held in the office of President F. R. Moulton, Chicago, Illinois, Thursday, April 12, 1928. The meeting was called to order at 9:30 by President Moulton. Those present were: President Moulton, Secretary Ellery, Treasurer Pegram, Professor Ward, Dr. Durand, Dr. Whitney, Professor Baitsell, Dr. Louis B. Wilson and Mr. Davies. By invitation, the following members of the Alumni Committee were present: Mr. Davies, Dr. Utley, Dr. Baker and Mr. Sweet.

Business was transacted as follows:

1. CLARK UNIVERSITY:

Information about the institution was presented in the prescribed form.

Voted—That the Secretary be requested to ask the group to make ten copies of this information, to be presented to each member of the committee for detailed study.

2. PENNSYLVANIA STATE COLLEGE:

Informal petition was presented and considered.

Voted—To appoint an official visitor to visit Pennsylvania State College and make report at a future meeting of the committee.

3. STATE COLLEGE OF WASHINGTON:

Informal petition was presented and considered.

Voted—To appoint an official visitor to visit the State College of Washington at Pullman. (Suggested that the Secretary be the official visitor by virtue of his previous knowledge of the institution.)

4. UNIVERSITY OF WYOMING:

Voted—That the Sigma Xi Club at the University of Wyoming be requested to present an informal petition for consideration at a future meeting.

5. UNIVERSITY OF OKLAHOMA:

Information about the institution was presented, and it was

Voted—That the information submitted be accepted as an informal petition and, further, that an official visitor be appointed to visit and report on the institution.

6. UNIVERSITY OF ROCHESTER:

Information about the institution was presented, and it was

Voted—That the University of Rochester be invited to send an informal petition.

7. INQUIRIES REGARDING CHAPTERS AT SEPARATE BRANCHES OF UNIVERSITIES:

Inquiries were presented from branches of several universities located at a distance from the institutional chapter regarding the possibility of the formation of a separate chapter.

Voted—That every institution contemplating a petition shall be considered on its own merits irrespective of previous action of the Society. Each geographically separated, degree-granting division of any institution shall be considered on its own merits.

8. THE FISCAL YEAR OF THE SOCIETY:

The fiscal year of the Society is the calendar year. Changes of address of chapter members usually occur at the beginning of the academic year. The question was discussed of making the fiscal year of the Society correspond with the academic year.

Voted—That the President, Secretary and Treasurer be appointed a committee to work out the procedure, with power to act.

9. ADDRESSOGRAPH LIST IN THE SECRETARY'S OFFICE:

The mailing list for the QUARTERLY is maintained in the Secretary's office, but the addressograph list is in the office of the publisher. Two sets of corrections are thus made necessary. It was

Voted—To authorize the purchase of an Addressograph machine.

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Adjourned for luncheon at the University Club at 12:20.

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10. ENGRAVING ON THE INSIGNIA:

The Secretary presented letters from members objecting to the present form of engraving on the back of the key on the ground that too much space is given to the date of the founding of the chapter and too little space to the member's name, the name of the chapter and the date of initiation. It was

Voted—That the following amendment to the Constitution be presented to the Chapters for action at the December Convention: Article VI, Section 1, be changed to read: "On the reverse side of

back of the badge shall be engraved the name of the Chapter in which the owner was initiated, together with the date of such initiation, and the owner's name."

This omits the sentence: "In the center the numeral of the year in which such chapter was chartered."

11. POLICY OF THE QUARTERLY:

The Secretary called attention to the March, 1928, QUARTERLY of 44 pages containing Dr. Little's article on "Mammalian Genetics" and Professor Crew's article on "Sigma Xi and Science," and stated that subsequent issues of the quality of the March number could not be published without increasing the budget item allowed for the QUARTERLY. It was

Voted—That during the coming year we publish four numbers of the general type of this March issue. The additional expense shall be taken from unexpended funds of the Society.

12. LIMITATION OF FIELDS OF INVESTIGATION RECOGNIZED BY SIGMA XI:

The Secretary read several letters of inquiry regarding fields of science which it is the object of Sigma Xi to recognize in the choice of its members and associates. In this connection, Professor Crew's article in the March, 1928, issue of the QUARTERLY was again emphasized.

Voted—That the list of sciences given on page 40 of the March, 1928, issue of the QUARTERLY should be accepted as indicating the fields of investigation recognized by Sigma Xi, with the addition that line 6, page 40, should read "Biology in its various branches, including psychology."

13. ALUMNI RESEARCH FUND:

The Secretary announced that the collection of this fund for the current year was in progress. There was considerable discussion regarding the best uses of the funds thus collected, and Mr. Sweet of the Alumni Committee was asked to prepare an article for the QUARTERLY on the sources of the various funds for research now available in this country, the utilization of such funds, and possible ways in which Sigma Xi could meet present-day needs.

14. INSTALLATIONS:

The Secretary reported that Chapters had been installed at the University of Arizona, University of Maryland, Lehigh University,

Kansas State College, and the University of Illinois College of Medicine, and that accounts of the installations would be printed in the QUARTERLY.

15. NEW YORK CONVENTION: SUB-COMMITTEE; SPEAKER:

The Convention Committee to arrange for the meeting to be held in New York December 27, 1928, was appointed as follows: Pegram and Ellery. It was

Voted—That the Convention be called to meet at four o'clock on the date named and in the place where the annual dinner will be held.

16. DR. KELLOGG:

The Secretary reported that Dr. Vernon Kellogg was unable to accept his election as president of the Society. In accordance with the By-Laws of the Society, by which the Executive Committee of the Society is empowered to designate officers to act in the case of vacancies, the Executive Committee named Professor Moulton as president until the next Convention.

17. INSIGNIA:

The Secretary reported the efforts of certain jewelers to secure the business of manufacturing and distributing the insignia of the Society contrary to the action of the Kansas City Convention in 1925, authorizing an official jeweler and the distribution of insignia through the office of the national secretary. The matter was referred to the Secretary with power.

The Secretary presented criticisms from various chapters regarding the associate pin. Since the meeting President Moulton has appointed the following committee to consider the matter: Dean Ellery, Dean Pegram, Professor Baitsell, and Mr. Sweet.

18. NEW SIGMA XI CLUBS:

The Secretary reported newly organized Sigma Xi clubs as follows:
Louisiana State University, Baton Rouge
Medical College of Virginia, Richmond

19. COMMITTEE ON LIFE MEMBERSHIP:

Mr. Davies and Dean Pegram, Committee on Life Membership, made a report, and upon their recommendation it was

Voted—That the matter of Life Membership fee be laid on the table indefinitely.

20. COLLEGE HONOR SOCIETIES:

The Secretary brought up the question of further participation in the so-called College Honor Societies, an organization which now comprises: Phi Beta Kappa, Sigma Xi, Tau Beta Pi, Order of the Coif, Phi Kappa Phi, Alpha Omega Alpha. It was

Voted—That the Executive Committee recommend to the Convention permanent membership in the Association of College Honor Societies.

21. REPORT OF WORK OF SECRETARY'S OFFICE:

The Secretary presented supplementary report of the work of his office since the Annual Report made at the Convention in Nashville, stating that in the work of circularizing the alumni members and associates, 6100 letters had been sent out; that contributions amounting to approximately $900 had been received; and that 154 keys and 22 pins had been sold since January 1, 1928.

22. BUDGET:

The Treasurer requested that an addition to the budget be made to cover items of postage and clerical expenses. It was

Voted—That the budget be adjusted by adding not to exceed $100 for the expenses of the Treasurer's office.

EDWARD ELLERY, *Secretary*

CHAPTER OFFICERS

LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTERS

CHAPTER	PRESIDENT	VICE-PRES.	SECRETARY	TREASURER
Cornell	R. C. Gibbs	O. A. Johannsen	W. A. Hagan	A. J. Eames
Rensselaer	L. W. Clark	G. K. Palsgrove	E. M. Clark	W. J. Williams
Union	P. I. Wold	J. W. Mavor	C. B. Hurd	C. B. Hurd
Kansas	O. O. Stoland	R. C. Moore	G. W. Smith	H. E. Jordan
Yale	J. I. Tracy	S. R. Brinkley	A. F. Hill	L. E. Seeley
Minnesota	C. H. Bailey	M. C. Sneed	J. H. Van Vleck	Wm. Cooper
Nebraska	M. H. Swenk	N. A. Bengtson	E. N. Andersen	M. G. Gaba
Ohio	W. J. McCaughey	Paris B. Stockdale	P. W. Ott	F. A. Hitchcock
Pennsylvania	T. D. Cope	R. H. True	W. H. Barton, Jr.	W. R. Taylor
Brown	S. T. Arnold	J. W. Wilson	C. W. Miller	C. R. Adams
Iowa	C. A. Ruckmick	C. J. Lapp	N. O. Taylor	F. A. Stromsten
Stanford	J. E. Coover	C. L. Alsberg	G. M. Smith	D. L. Webster
California	E. D. Merrill	C. W. Porter	S. K. Allison	F. H. Cherry
Columbia	D. W. Johnson	R.S.Woodworth	P. F. Kerr	P. F. Kerr
Chicago	Julius Stieglitz	H. G. Wells	M. E. Hanke	M. E. Hanke
Michigan	H. M. Randall	H. E. Lewis	C. E. Guthe	R. C. McAlpine
Illinois	M. L. Enger	W. H. Rodebuch	A. C. Bevan	T. H. Frison
Case	Anthony Jenkin	T. D. Owens	J. R. Martin	T. M. Focke
Indiana	S. C. Davisson	F. C. Mathers	J. E. Switzer	Paul Weatherwax
Missouri	H. D. Hooker	M. P. Weinbach	M. G. Mehl	H. H. Charlton
Colorado	W. C. Toepelman	J. A. Hunter R. M. Hill	C. F. Poe	F. S. Bauer
Northwestern	A. A. Day	F. D. Barker	A. J. Walcott	Sara I. Lewis
Syracuse	H. N. Eaton	R. S. Boehner	Mrs. M. N. Harwood	C. C. Forsaith
Wisconsin	G. W. Keitt	H. A. Schuette	R. A. Brink	A. K. Lobeck
University of Washington	H. K. Benson	R. C. Miller	Hewitt Wilson	E. R. Wilcox
Worcester	M. E. Smith	G. H. MacCullough	H. J. Gay	Harris Rice
Purdue	E. B. Mains	R. B. Wiley	W. E. Edington	H. MacGillivray
Washington University	P. A. Shaffer	A. S. Langsdorf	H. Lee Ward	L. F. Thomas
District of Columbia	W. T. Lee	E.C.Crittenden	A. E. Eckhardt	M. A. Griffith
Texas	J. M. Kuehne	J. T. Buchholtz	E. C. H. Bantel	H. L. Lochte
Mayo Foundation	Chas. Sheard	H. E. Robertson	A. E. Osterberg	A. E. Osterberg
N. Carolina	J. F. Dashiell	T. F. Hickerson	J. H. Swartz	J. H. Swartz
N. Dakota	A. G. Leonard	E. E. Harris	E. A. Baird	E. A. Baird
Iowa State College (formerly *Ames*)	P. E. Brown	P.Mable Nelson	J. A. Wilkinson	G. W. Snedecor
Rutgers	R. C. H. Heck	Richard Morris	W. R. Robbins	T. J. Murray
McGill	H. M. Mackay	J. C. Meakins W. G. McBride	D. A. Keys	J. Beattie
Kentucky	George Roberts	W. R. Allen	M. N. States	G. D. Buckner
Idaho	J. A. Kostalek	C. W. Hunderford	J. H. Johnson	H. P. Magnuson
Swarthmore	W. R. Wright	Arnold Dresden	H. J. Creighton	H. J. Creighton
Oregon	E. H. McAllister	G. E. Burget	Ethel Sanborn	H. G. Tanner
Virginia	W. A. Nelson	L. G. Hoxton	B. D. Reynolds	B. D. Reynolds
Johns Hopkins	B. E. Livingston	K. Dunlap	M. W. Pullen	R. P. Cowles

CHAPTER OFFICERS (*Continued*)

LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTER

CHAPTER	PRESIDENT	VICE-PRES.	SECRETARY	TREASURER
Calif. Institute of Technology	R. C. Tolman..	J. A. Anderson.	W. H. Clapp...	S.S. Mackeown
New York University...	H. D. Senior...	R. Mulliken...	H. W. Stunkard	H. W. Stunkard
University of Cincinnati...	H. S. Fry.....	O. T. Wilson...	S. B. Arenson..	S. B. Arenson
Michigan State College	V. R. Gardner.	F. C. Bradford.	R. M. Snyder..	E.F. Woodcock
Arizona.....	S. P. Burgess ..	G. T. Caldwell	H. B. Leonard	H. B. Leonard
Lehigh.....	C. R. Richards.	B. L. Miller....	L. L. Smail....	C. C. Bidwell
Maryland.....	C. O. Appleman	E. C. Auchter..	M. M. Haring..	M. M. Haring
Kansas State College.....	L. E. Call	G. A. Dean....	C. W. Colver...	G. E. Raburn
Col. of Medicine Univ. of Illinois.....	D. J. Davis	.....	W. H. Welker..	I. Pilot

SIGMA XI CLUBS

CLUB	PRESIDENT	VICE-PRES.	SECRETARY	TREASURER
Oklahoma.....	P. B. Sears....	C. N. Gould...	Wm. Schriever.	Wm. Schriever
Southern California...	R. W. Sorensen	S. J. Barnett...	H. de Forest ..	H. de Forest
Duluth.....	.....	.....	E. W. Kelly....	.....
Carleton College.....	H. E. Stork....	F. F. Exner....	C. H. Gingrich.	C. H. Gingrich
University of Denver.....	T. R. Garth....	R.E.Nyswander	E. A. Engle.....	W. H. Hyslop
Oregon State Agricultural College.....	W. V. Halversen	.....	C. H. Owens...	C. H. Owens
West Virginia University...	A. M. Reese....	J. H. Gill.....	R. P. Davis....	.....
University of Maine.....	D. B. Young..	C. R. Phipps ..	C. B. Crofutt..	C. B. Crofutt
University of Pittsburgh...	K. D. Swartzel.	O.H. Blackwood	Richard Hamer	Richard Hamer
University of Wyoming....	Aven Nelson...	J. A Hill.....	O. H. Rechard.	O. H. Rechard
University of Florida.....	J. R. Benton...	O. F. Burger..	O. C. Bryan ...	O. C. Bryan
University of Rochester...	J. R. Murlin...	.....	H. L. Alling....	H. L. Alling
Colorado Agricultural College.....	G. T. Avery...	L. D. Crain....	L. W. Durrell..	L. W. Durrell
State College of Washington	C. C. Todd....	.....	Hannah Aase	.....
University of South Dakota	E. P. Rothrock	.....	H. C. Abbott..	H. C. Abbott
Louisiana State University...	L. J. Lassalle ..	H. V. Howe...	E. H. Behre...	E. H. Behre

OFFICIAL ANNOUNCEMENTS

All insignia of the Society are available only through the office of the national secretary. Orders for these insignia are issued through chapter secretaries, and must be **prepaid.** Information about styles and prices may be obtained from chapter secretaries or the national secretary.

PRINTED BLANKS

The General Convention has instructed the secretary to forward to chapters under the following stipulations:

Membership Certificates, stamped with the great seal of the Society. In packages of fifty prepaid, on advance payment of $2.50 for each package. Please specify carefully whether for active or associate members.

Index Cards, for members and associates. *Gratis.*

Chapter secretaries are requested to fill out these cards carefully giving PERMANENT addresses of the members, and return to the national secretary.

A few copies of the Quarter Century Record are available at $2.50 each.

Copies of the Constitution are available at 7 cents each.

SIGMA XI BANNERS

Chapters may obtain Sigma Xi Banners at the following prices:

Size 3 x 5—$ 8.00
4 x 6— 12.00
5 x 8— 20.00

CHANGES OF ADDRESS

All changes of address and all other correspondence should be addressed to the secretary of Sigma Xi, Edward Ellery, Union College, Schenectady, N. Y.